

Synima reynoldsiae P.I.Forst. (Sapindaceae), a new species from the ‘Wet Tropics’ of north-east Queensland

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Summary

Forster, P.I. (2006). *Synima reynoldsiae* P.I.Forst. (Sapindaceae), a new species from the ‘Wet Tropics’ of north-east Queensland. *Austrobaileya* 7(2): 285–291. A new species from the ‘Wet Tropics’ rainforest of north-east Queensland, *Synima reynoldsiae* is described and illustrated. This species is restricted to upland rainforest (simple to complex notophyll vineforests) on basalt, granite or rhyolite derived substrates. A revised key to the Australian species of *Synima* is provided.

Key Words: Sapindaceae, *Synima reynoldsiae*, new species, Wet Tropics biodiversity, Australian flora, Queensland flora, identification key

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Introduction

The genus *Synima* Radlk. is endemic to Australia and New Guinea with two species recognised (Reynolds 1985b; Leenhouts & Adema 1994). *Synima* is thought to be related to genera such as *Mischocarpus* Blume, *Sarcotoechia* Radlk. and *Toechima* Radlk., at least with respect to its placement in taxonomic accounts of the family. These putative affinities have been based on floral and fruit morphology and it is likely that molecular analyses will provide alternative data sets to build future generic classifications in the Sapindaceae.

Sterile collections of a Sapindaceous tree, superficially similar to *Guioa montana* C.T.White, have been made in the ‘Wet Tropics’ bioregion of north-east Queensland since the early 1950’s. Fertile specimens of flowers (both sexes), fruits and seeds of this tree, collected mainly in the late 1980’s and early 1990’s, led Sally Reynolds to place tentative identifications of several fruiting and sterile collections as *Sarcotoechia* sp. nov. (November 1979) and later as *Synima* sp. nov. (November 1985); however, the latter generic assignment was not taken up at the time. Features of its fruit morphology led to it being listed at BRI as *Sarcotoechia* sp. (Mt Carbine L.W.Jessup+ GJM995) (Reynolds 1987b; Forster & Jessup 2002) and at QRS as *S.* sp.

(Mountain *Sarcotoechia* WWC100) (Hyland *et al.* 2003); however, this generic assignment was based on an incomplete character data set. Several characters, especially those of the petals (crested, versus uncrested) and seed sarcotesta (covering the seed apart from an adaxial dorsal strip, versus annular around the hilum to cupular and covering up to one-third of the seed) negate its inclusion in *Sarcotoechia* and reinforce its placement in *Synima*.

The genus *Synima* is distinguished by the leaflets without domatia, a shortly cupular calyx with ovate sepals that are hairy on both surfaces, crested scales on the petals, the unwinged and shortly stipitate fruit capsule with valves that are thin when dried, villous hairy inside and with keeled sutures, and the seed with a fleshy, yellow-orange sarcotesta that is small and basal or mantle-like and \pm covering the seed (Reynolds 1985b; Leenhouts & Adema 1994). The fruit are bright red and the black or dark brown seeds are \pm entirely covered by the sarcotesta in *S. cordieriorum* (F.Muell.) Radlk., whereas in *S. macrophylla* S.T.Reynolds this structure is small and only at the base of the seed. Although this fleshy seed covering has been described as an aril (Reynolds 1985b; Hyland *et al.* 2003; Cooper & Cooper 2004) it is more correctly termed a sarcotesta as it is adnate to the exotesta of the seed (Adema *et al.* 1994).

All of the above mentioned generic features of *Synima* are present in the undescribed species being considered here, with the seed sarcotesta being most similar to that of *S. cordierorum*. The foliage of this undescribed species is markedly different to that of both *S. cordierorum* and *S. macrophylla* in size, colour and indumentum cover. Florally it is similar to both these species, apart from the unkeeled petals and several aspects of size and indumentum cover. The flowers are unisexual as with most Sapindaceae (Adema *et al.* 1994; Gross 2005) and the two other species of *Synima*. Although plants may appear dioecious, observations over a period of time usually reveal that they are functionally monoecious. The fruits of the new species are very similar to those of *S. cordierorum* but differ slightly in shape and most noticeably in the colour of the interior of the valves (Cooper & Cooper 2004). It is here described as the new species *Synima reynoldsiae*.

Material & methods

The data and description presented in this paper are based on holdings at BRI and QRS. Latitude and longitude records on QRS specimens have not been corroborated or localised, so may be inaccurate due to the use of 'generic' site records. The species description is loosely modelled on that for *Cupaniopsis cooperorum* (Forster 2002), but with more detail given to venation description following the terminology of Hickey (1973) and Ash *et al.* (1999). In their scheme the different components of venation are described using a numerical system with the recognition of a midrib (1° vein order), lateral veins (2° vein order) and intercostal veins (3° and onwards vein orders) within any leaf lamina. When an intercostal vein comprises a continuous raised line of cells it is termed 'distinct'; if it is discontinuous or fades away into the body of the lamina, it is termed 'indistinct'. Indumentum cover is described using the terminology of Hewson (1988), except that 'scattered' is used instead of 'isolated'. The shapes of leaves, sepals and petals are described using the terminology of Hickey & King (2000). Length and width dimensions are indicated as length measurement × width measurement followed by the measurement unit.

Taxonomy

Synima reynoldsiae P.I.Forst., **species nov.**
a *S. cordierorum* foliolis integris (adversum foliola dentata in foliis juvenilibus, saepe apicem versus dentata in foliis adultis), venis secundariis lateralibus 12–22 utrinque costae (non 8–14) et paginis inferioribus impolitis cremeo-flavis usque fere albis (adversum paginas subvirides in sicco brunneas); pedicellis longioribus (2–5 mm non 1–1.5 mm longis); petalis quam sepalis longioribus (in illa adversum petala sepala aequantia vel eis longioribus) et indumento denso externe (adversum indumentum sparsum adpersum vel localiter dispositum), carina absente (adversum carinam praesentem) et squamis cristatis (in illa incristatis); et fructu subgloboso (non obovoideo) differt. **Typus:** Queensland. COOK DISTRICT: Harrington Property, Seamark road, Tarzali, 17°26'S, 145°32'E, 25 November 2002, *W. Cooper & W.T. Cooper WWC1798* (holo: BRI [3 sheets]; iso: A, L, MEL, MO, NSW, Z distribuendi).

Sarcotoechia sp. (Mt Carbine L.W.Jessup+GJM995) in Forster & Jessup (2002).

Sarcotoechia sp. (Mountain Sarcotoechia WWC100) in Hyland *et al.* (2003) & Cooper & Cooper (2004: 484).

Illustrations: Hyland *et al.* (2003); Cooper & Cooper (2004: 484).

Trees to 20 m high, functionally monoecious. Stem surface shallowly corrugated, lenticels small, round, in longitudinal vertical lines; blaze granular and layered, cream, then pink-brown, with 'Poison Peach' (*Trema tomentosa*) odour. Indumentum (unless otherwise stated) of pale, fawn-yellow, antrorse simple trichomes, rarely sessile, stellate trichomes or short, papillate trichomes. Branchlets angular, somewhat winged, dark black-grey, with scattered, longitudinally distributed lenticels; new growth with dense indumentum, glabrescent; flowering twigs 1–3 mm thick. Leaves (1–) 2–4 (–6) -jugate, rarely unifoliate; petiole angular, 18–115 × 0.8–1.5 mm, deeply grooved on top, with sparse indumentum of simple trichomes and short papillate trichomes; rachis ± flattened, unwinged, 10–160 (–240) mm long, with

sparse indumentum of simple trichomes and short papillate trichomes. Petiolules 5–13 × 0.8–1 mm, deeply grooved on top, with scattered to sparse indumentum; pulvini 2–5 mm long. Leaflets alternate to subopposite, coriaceous, elliptic to oblanceolate, rarely elliptic-ovate, oblong or obovate, (24–) 32–115 (–175) × (9–) 18–55 mm, length-width index 2.4–4.3, base acute, obtuse or rounded, often assymetric; apex acute, shortly acuminate or obtuse, rarely retuse; margins entire, flat; upper surface dark-green, glossy, glabrous; lower surface cream-yellow to almost white, with scattered indumentum mainly on veins. Leaflet lamina venation prominent; 1° venation comprising a midrib that is prominently raised below and visible, but flat to the leaflet surface above; 2° venation comprising 12–22 lateral vein pairs per side of the midrib, 4–12 mm apart in the central part of the leaflet, visible on both surfaces but prominently raised, dark-yellow and with scattered indumentum below; 3° venation markedly reticulate, prominently raised below, visible but not raised above, dark-yellow and with scattered to occasional indumentum below; 4° venation reticulate, indistinct above and below; 5° venation very indistinct on both surfaces. Inflorescences erect to decumbent, axillary or pseudoterminal, thryoid, not branching from base, 8–15 mm long and with side branches to 7 cm long, with sparse to dense indumentum; bracts and bracteoles deltoid-triangular, 0.8–1.2 mm × 0.3–0.6 mm, with dense indumentum. Flowers in shortly pedunculate cymules. Male flowers 1–5 per cymule, 2–4 × 2.5–5 mm; pedicels filiform, 2–5 × c. 0.3 mm, with dense indumentum; calyx cupular, sepals 5, fleshy, elliptic-ovate, 1.8–3 × 1.3–2 mm, weakly imbricate at base, green, externally with dense indumentum, internally with sparse indumentum; petals 5, spatulate, as long or shorter than the sepals, 1.8–3 × 1.8–2 mm wide at top, c. 0.5 mm wide at base, cream, externally unkeeled and with scattered long indumentum, internally with crested scales 1.5–2 × c. 1 mm, with dense, shaggy indumentum; disk fleshy-annular, 2–2.5 mm diameter, glabrous; stamens (7 or) 8; filaments 1.2–3.5 × 0.1–0.3 mm, thicker towards base, with shaggy indumentum; anthers 0.6–0.8 × c. 0.5 mm, with scattered

indumentum; pistillodes 1–1.2 mm long, with dense indumentum. Female flowers generally one per cymule, not seen at anthesis; calyx cupular, sepals 5, fleshy, elliptic-ovate, 2.2–3 × 1.8–2.2 mm, weakly imbricate at base, externally with dense indumentum, internally with sparse indumentum; petals ?absent; disk fleshy-annular, c. 3.5 mm diameter; pistil 1.8–2 × c. 0.4 mm, with sparse to dense indumentum, style slightly lobed; ovary c. 4 × 2 mm, with dense indumentum. Fruit a fleshy, subglobose capsule, very shortly stipitate, 10–18 × 14–21 mm, 2 or 3-lobed, pink-red; valves opening loculicidally, slightly rugose and with scattered indumentum at dehiscence, thinly keeled to 2 mm on sutures, internally with dense, shaggy white or pink trichomes, suture edges recurving at dehiscence exposing the seeds, yellowish. Seeds obovoid, 12–14 × 7–10 mm, black, ± entirely covered in orange-yellow sarcotesta apart from area around pseudohilum and a dorsal slit. **Fig. 1.**

Additional specimens examined (*sterile collections, tentative identification; #flowering collection; #fruiting collection): **Queensland.** COOK DISTRICT: S.F.R. 0.5 km past W Spencer Creek forestry camp, S.F. 144, Cockatoo L.A., 33 km NNW of Mt Carbine, 16°15'S, 145°02'E, Nov 1988, *Jessup GJM1148 et al.** (BRI); 0.4 km before W Spencer Creek forestry camp, S.F. 144, Cockatoo L.A., 16°15'S, 145°02'E, Nov 1988, *Jessup GJM1296 et al.** (BRI); *loc. cit.*, Nov 1988, *Jessup GJM1385 et al.** (BRI); 144, Fantail L.A., E/P 44, 16°12'S, 145°05'E, Nov 1980, *Sanderson 1815** (QRS); Mt Windsor, S.F.R. 144, E/P 30, 16°17'S, 145°05'E, Jul 1976, *Unwin 10** (QRS); Mt Misery, E of Mt Spurgeon, 16°26'S, 145°13'E, Nov 1988, *Jessup GJM959 et al.** (BRI); 15.4 km NNE of Mt Carbine, track near Mt Spurgeon – Mt Carbine Tableland near 7-cornered house, 16°27'S, 145°12'E, Nov 1988, *Jessup GJM995 et al.** (BRI); S.F.R. 143, Cow L.A., near Schillers Hut, 16°27'S, 145°12'E, Sep 1996, *Ford 1766** (QRS); Mt Lewis road, boundary of Round L.A. & Carbine L.A., 20 km NNW Mt Molloy, Nov 1988, *Jessup GJM218 et al.** (BRI); North Mary L.A., S.F.R. 143 Mt Lewis, 16°30'S, 145°16'E, Oct 1973, *Sanderson 465**, *488** (QRS); ; Davies Creek Plot (ridge), 17°05'S, 145°34'E, *s. dat.*, *Webb & Tracey 13119** (BRI); Noel L.A., 17°05'S, 145°35'E, Feb 1978, *Risley 475^r* (BRI, QRS); Emerald L.A., S.F.R. 607, 17°09'S, 145°33'E, Jul 1973, *Sanderson 301** (QRS); E/P 3, S.F.R. 607, Emerald L.A., 17°09'S, 145°38'E, Nov 1977, *Sanderson 1328** (QRS); Mt Misch, Herberton Range, near Bones Knob, 17°15'S, 145°25'E, Sep 1996, *Ford 1762** (QRS); S.F. 194, Mt Baldy, 6 km from Rifle Range end, 17°16'S, 145°25'E, Jun 1996, *Forster PIF19219 et al.** (BRI); Mt Baldy, 5.4 km W of Atherton near Walsh Falls, 17°17'S, 145°25'E, Nov 1988, *Jessup GJM1973 et al.** (BRI); Herberton Range, 1962, *Webb & Tracey 7958** (BRI); S.F.R. 194, Moomin,

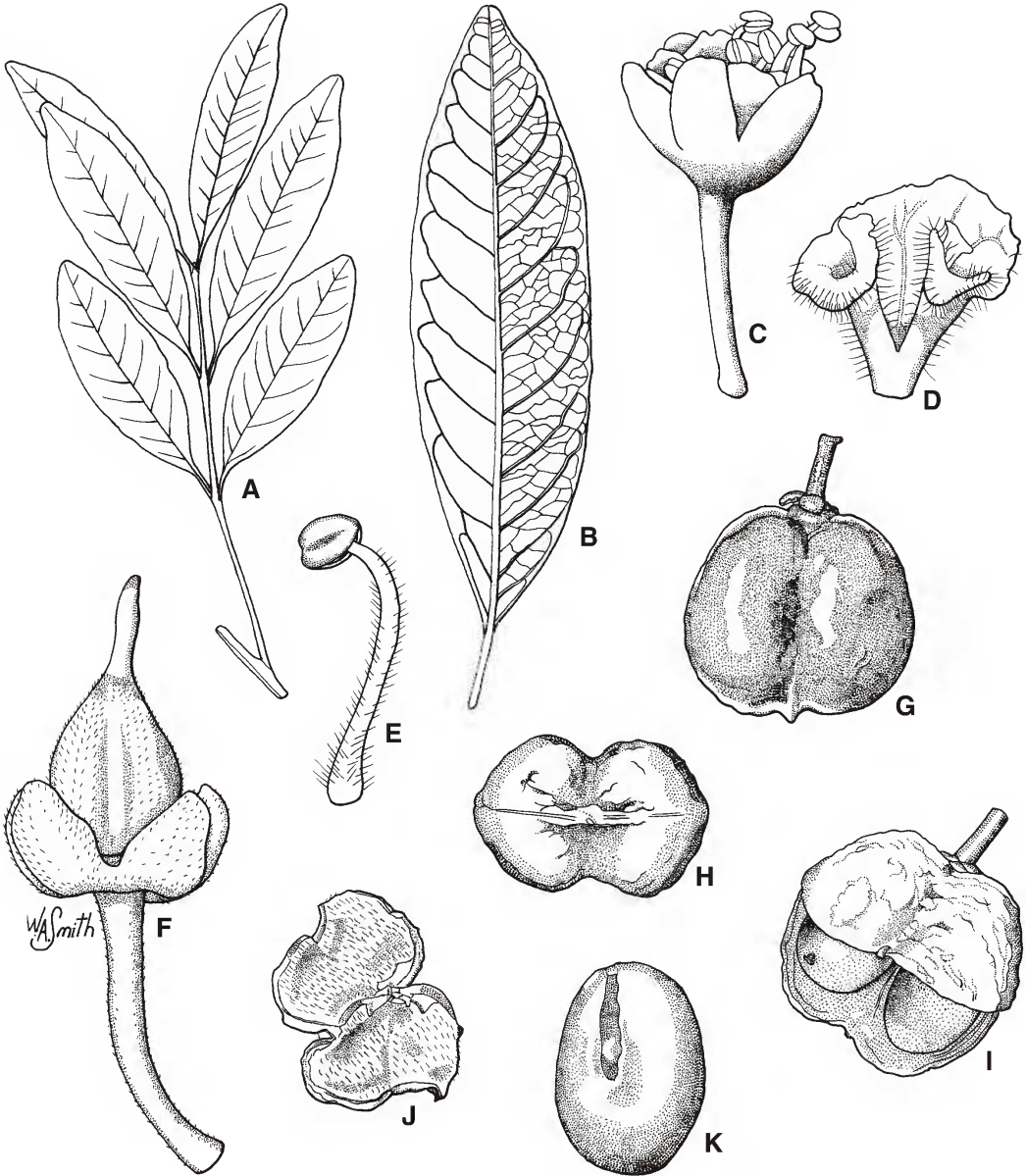


Fig. 1. *Synima reynoldsiae*. A. leaf $\times 0.6$. B. detail of venation in individual leaflet viewed from below $\times 1$. C. side view of male flower $\times 6$. D. internal view of petal showing two scales covered in indumentum $\times 12$. E. stamen $\times 12$. F. side view of female flower $\times 6$. G. side view of intact capsule $\times 1.5$. H. face view of intact capsule $\times 1.5$. I. lateral view of dehiscent capsule with seed in situ $\times 1.5$. J. face view of dehiscent, empty capsule $\times 1.5$. K. lateral view of seed covered in sarcotesta showing dorsal split $\times 2$. A–E, *Cooper WWC1798* (BRI); F, *Cooper WWC449* (BRI); G–K, *Cooper WWC100* (BRI). Del. W.Smith.

17°17'S, 145°27'E, May 1971, *Dockrill 115** (BRI, QRS); S.F.R. 194, Cpt 53, Western, 17°18'S, 145°26'E, Jan 1990, *Bragg 20111** (QRS); S.F.R. 194 Western, Cpt. 59, E/P 36, 17°19'S, 145°26'E, Mar 1977, *Unwin 270** (QRS); Harrington Property, Seamark road, Malanda, 17°26'S, 145°32'E, Jan 1992, *Cooper & Cooper WWC100** (QRS); *loc. cit.*, Nov 1992, *Cooper & Cooper WWC449th* (QRS); along Microwave tower access road, Longlands Gap, 17°28'S, 145°29'E, May 1996, *Ford 1712** (BRI, QRS); Mt Fisher, off Sluice Creek road, 17°32'S, 145°32'E, Dec 1996, *Jensen 808** (QRS); Portion 25, Ravenshoe, 17°33'S, 145°31'E, Oct 1951, *Volck AFO70** (QRS); S.F.R. 251, South Coochimbeerm L.A., 1.5 km SE of Mt Koolmoon, 17°42'S, 145°32'E, May 2001, *Ford AF2843 & Hewitt** (BRI); S.F.R. 605, Hilton L.A., 17°50'S, 145°35'E, Dec 1984, *Gray 3791th* (QRS).

Distribution and habitat: *Synima reynoldsiae* occurs widely in the Wet Tropics bioregion of north-east Queensland with a northern limit at Mt Windsor Tableland in State Forest 144 and a southern limit near Mt Koolmoon in State Forest 251 (**Map 1**). There appears to

be a natural disjunction in the populations between Mt Lewis south-west of Mossman and Davies Creek south-east of Mareeba, presumably due to the lack of suitable habitat. Plants occur as scattered individuals in upland rainforest (simple to complex notophyll vineforests) on substrates derived from basalt, granite or rhyolite at altitudes between 1000 and 1300 m.

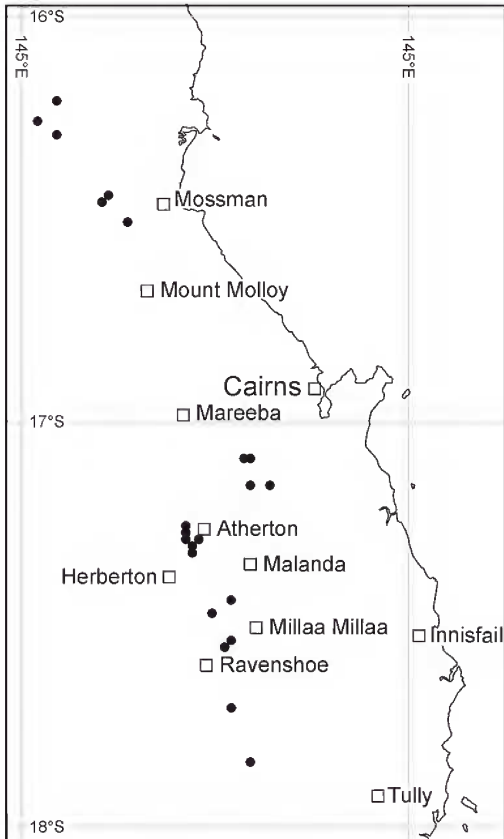
Notes: *Synima reynoldsiae* is unique within this genus by its leaflets that are always entire with cream-yellow to almost white undersides; the petals that are not keeled externally, not longer than the sepals, with dense indumentum externally; and the fruit capsule valve sutures that are pale yellow. It is distinguished from the other species of *Synima* by the following key.

Key to the species of *Synima*

- 1 Branchlets 6–10 mm diameter; inflorescences unbranched, or with only 1 to 3 side branches; cymules subsessile; sarcotesta covering only base of seed **S. macrophylla**
- Branchlets less than 5 mm diameter; inflorescences thyrsoid with 3 or more branches; cymules pedunculate; sarcotesta covering lower third or nearly whole of seed 2
- 2 Leaflets toothed in juvenile foliage, often toothed towards apex in adult foliage; 2° lateral veins 8–14 per side of leaflet midrib, leaflets glossy pale-green (drying brown) below; pedicels 1–1.5 mm long; petals slightly keeled and with scattered to localised sparse indumentum externally, scales uncrested; fruit capsules obovoid, valve sutures white **S. cordierorum**
- Leaflets entire in juvenile and adult foliage; 2° lateral veins 12–22 per side of leaflet midrib, leaflets matt cream-yellow to almost white below; pedicels 2–5 mm long; petals unkeeled and with dense indumentum externally, scales crested; fruit capsules subglobose, valve sutures yellowish **S. reynoldsiae**

Conservation status: Based on current knowledge of its distribution *Synima reynoldsiae* is widespread and relatively common within the Wet Tropics bioregion. It is present in State Forests 143, 144, 194, 251, 605 and 607. No conservation coding is required.

Etymology: The specific epithet honours Sally T. Reynolds, formerly a Principal Botanist at the Queensland Herbarium and specialist on Australian Sapindaceae (Reynolds 1981, 1982, 1984, 1985a, 1985b, 1987a, 1991). Sally established the modern taxonomic framework for this family in Australia with the description of 45 new species and four subspecies or



Map 1. Distribution of *Synima reynoldsiae* in north-east Queensland.

varieties in the genera *Alectryon* (4 spp., 2 subsp.), *Arytera* (3 spp.), *Atalaya* (6 spp.), *Cossinia* (1 sp.), *Cupaniopsis* (4 spp., 1 var.), *Diploglottis* (6 spp.), *Distichostemon* (1 sp.), *Elattostachys* (2 spp.), *Jagera* (1 sp., 1 var.), *Lepiderema* (3 spp.), *Mischocarpus* (4 spp.), *Rhysotoechia* (1 sp., 1 subsp.), *Sarcopteryx* (3 spp.), *Sarcotoechia* (3 spp.), *Synima* (1 sp.) and *Toechima* (2 spp.).

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